PART IV

DETAILED SPECIFICATION

PART IV – DETAILED SPECIFICATIONS

SECTION ONE: GENERAL

1.1 Scope

A. This specification document provides the requirements for the installation, programming and configuration of a complete IntelliKnight 5820XLEVS digital protocol addressable fire alarm system. This system shall include, but not be limited to, system cabinet, power supply, built in Signaling Line Circuit (SLC), 80 character LCD annunciator, six programmable Flexput circuits, built-in dual line digital communicator associated peripheral devices, batteries, wiring, conduit and other relevant components and accessories required to furnish a complete and operational life safety system. Approved equal by Simplex, Edwards, Notifier or Gamewell following the criteria in Section 1.4.4 shall be entertained.

1.2 Work Included

A. New addressable, voice evacuation Fire alarm system as specified and as required by Code.

B. New duct detectors on all existing Air Systems over 2000CFM. Provide all connections, wiring, relays, etc. required to shut down the air system fan motors.

C. Connection to sprinkler pressure, tamper and flow switches.

D. Testing of the fire alarm system shall be performed in front of the owners and the State Fire Marshal's representatives.

E. Elevator recall relays and required control wiring to the elevator controller when building is equipped with elevator.

F. Complete demolition of existing fire alarm system to include removal and disposal of all related equipment and devices. All wiring to be removed in its entirety. Walls shall be repaired and painted to match existing. Where applicable and approved by the owner, blank covers may be installed and painted to match existing finish. The owner reserves the right to keep any existing equipment for their use.

G. Submit required documentation for review to the local fire marshal having jurisdiction.

H. Connection of the hood extinguishing system when so equipped.

I. All wiring shall be contained in EMT conduit or metallic wire mold. Use of metallic wire mold shall require approval by FSU Engineer.

1.2.1 General Requirements

A. The contractor shall furnish and install a complete 24 VDC, electrically supervised, analog addressable fire alarm system as specified herein and indicated

on the drawings. The system shall include but not be limited to all control panels, power supplies, initiating devices, audible and visual notification appliances, alarm devices, and all accessories required to provide a complete operating fire alarm system.

1.2.2 **Listings**

A. All fire alarm system equipment shall be listed for its intended purpose and be compatibility listed to assure the integrity of the complete system.

1.3 **Standards**

A. The fire alarm equipment and installation shall comply with the current provisions of the following standards and shall be listed for it's intended purpose and be compatibility listed to insure integrity of the complete system.

1.3.1 **National Electric Code, Article 760**

1.3.2 **National Fire Protection Association Standards:**

NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code
NFPA 101	Life Safety Code

1.3.3 **Local and State Building Codes**

BOCA, National Building Code, Mechanical Code, Fire Prevention Code

1.3.4 **Local Authorities Having Jurisdiction**

1.3.5 **Underwriters Laboratories Inc.**

A. All equipment shall be approved by Underwriters Laboratories, Inc. for its intended purpose, listed as power limited by Underwriters Laboratories, Inc., for the following standards as applicable:

UL 864 UOJZ	Control units for Fire Protective Signaling Systems Local Signaling Unit Central Station Signaling Protected Premises Unit Remote Signaling Protected Premises Unit Water Deluge Releasing Unit
UL 268	Smoke Detectors for Fire Protective Signaling systems.
UL 268A	Smoke Detectors for duct applications
UL 217	Smoke Detectors for Single Stations
UL 521	Heat Detectors for Fire Protective Signaling systems
UL 228	Door Holders for Fire Protective Signaling systems
UL 464	Audible Signaling appliances
UL 1638	Visual Signaling appliances
UL 38	Manually Activated Signaling Boxes
UL 346	Waterflow indicators for Fire Protective Signaling systems
UL 1481	Power Supplies for Fire Protective Signaling systems

UL 2572 Control and Communication Units for Mass Notification Systems

1.3.6 **Americans with Disabilities Act (ADA)**

A. All visual Notification appliances and manual pull stations shall comply with the requirements of the current Americans with Disabilities Act.

1.4 **General Requirements**

1.4.1 **Manufacturers/Distributors Services**

A. The following supervision shall be provided by a factory trained service technician from the distributor of the fire alarm equipment. The technician shall be trained and shall have a minimum of two (2) years of service experience in the fire alarm industry. The technician's name shall appear on equipment submittals and a copy of his manufacturer's training documentation shall be sent to the project engineer. The technician shall be responsible for the following items:

1. A pre-installation visit to the job site to review equipment submittals and to verify the method by which the system is to be wired.
2. During the installation the certified technician shall be on site or make periodic visits to verify installation and wiring of the system. They shall also supervise the completion of conduit rough in, wires pulled into conduit and wiring rough in.
3. Upon completion of wiring, final checkout and certification of the system shall be made under the supervision of this technician.
4. At the time of the formal checkout, technician shall give operational instructions to the owner and or his representative on the system.

1.4.2 **Submittals**

1. General Submittal Requirements.

1. The contractor shall submit three (3) complete sets of documentation within thirty (30) calendar days after award of the purchase order. Indicated in the document shall be the type, size, rating, style, catalog number, manufacturer's names, photos, and /or catalog data sheets for all items proposed to meet these specifications. The proposed equipment shall be subject to the approval of the fire marshal and no equipment shall be ordered or installed on the premises without that approval.

2. Submittal of shop drawings shall contain at least three (3) copies of original manufacturer specification and installation instruction sheets. Subsequent information may be copies. All equipment and devices on

the shop drawings to be furnished under this contract shall be clearly marked in the specification sheets.

3. Supplier's qualifications shall be submitted indicating years in business, service policies, warranty definitions, and completion of factory training program and a list of similar installations.

4. Contractor qualifications shall be supplied indicating years in business and prior experience with installations that include the type of equipment that is to be supplied.

5. The contractor shall provide hourly service rates, performed by a factory trained technician for this installed life safety system with the submittal. Proof of training and authorization shall be included with the submittal. These hourly service rates shall be guaranteed for a 1-year period.

6. Provide floor plan drawings with each set of submittals.

7. A submittal shall include equipment cuts, drawings, wiring diagrams, risers, sequence of operations, battery calculations.

B. Submittal Protocol

1. Submittals shall be sent to State Fire Marshal for approval and shall contain acceptance stamp. Contractor shall provide one (1) copy to Owner and retain one (1) original copy.

2. Additionally, it shall be required prior to installation to submit and obtain Fire Marshal approval for, but not limited to:

a. Wiring riser diagrams.

1.4.3 **Contract Close-Out Submittals**

A. Deliver two (2) copies of the following to the owner's representative within thirty (30) days of system acceptance. The closeout submittals shall include:

1. Installation and programming manuals for the installed life safety system.

2. Point to point diagrams of the entire life safety system as installed. This shall include all connected smoke detectors and addressable field modules.

3. All drawings shall reflect device address as verified in the presence of FSU Engineer.

1.4.4 **Products**

A. This life safety system specification shall be conformed to in its entirety to ensure that the installed and programmed life safety system shall accommodate all of the requirements and operations required by the building owner. Any specified item or operational feature not specifically addressed prior to the bid date shall be required to be met without exception.

B. Submission of product(s) purported to be equal to those specified herein shall be considered as possible substitutes only when all of the following requirements have been met:

1. Any deviation from the equipment, operations, methods, design or other criteria specified herein shall be submitted in detail to the FSU Engineer and the local fire marshal having jurisdiction a minimum of ten (10) working days prior to the scheduled submission of bids. Each deviation from the operation detailed in these specifications shall be documented in detail, including page number and section number, which list the system function for which the substitution is being proposed. The contractor or substitute bidder shall functionally demonstrate that the proposed substitute products are in fact equal in quality and performance to those specified herein.

1.4.5 **General Equipment and Materials Requirements**

A. All equipment furnished for this project shall be new and unused. All components shall be designed for uninterrupted duty. All equipment, materials, accessories, devices and other facilities covered by this specification or noted on the contract drawings and installation specification shall be best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided under this specification is provided by different manufacturers, then that equipment shall be "Listed" as to its compatibility by Underwriters Laboratories (UL), if such compatibility is required by UL standards.

1.4.6 **Satisfying the Entire Intent of these Specifications**

A. It is the contractor's responsibility to meet the entire intent of these specifications.

B. Deviations from the specified items shall be at the risk of the contractor until the date of final acceptance by the fire marshal having jurisdiction, and owner's representative.

C. All costs for removal, relocation, or replacement of a substituted item shall be at the risk of the Contractor.

END OF SECTION ONE

SECTION TWO: SPECIFICATIONS

2.1 General

2.1.1 Control Panel

A. Control Panel with Emergency Voice System

1. The fire alarm control panel (FACP) shall be the Silent Knight 5820XLEVS analog addressable control panel. The audio amplifiers shall be the Silent Knight EVS-50W or EVS-125W voice evacuation units. The FACP shall have a 6 amp power supply and be capable of expansion to a maximum of 54 total amps via bus connected expander modules that supervise low battery, loss off AC and loss of communication.

2. The system shall contain at least one Silent Knight EVS-50W or EVS-125W watt amplifier and shall be expandable up to 500 watts utilizing up to four additional amplifiers. Each amplifier shall be capable of adding a 4 zone splitter (Silent Knight EVS-CE4) to distribute the audio information to different locations in the installation. The system shall have the capability of controlling up to 40 notification zones. The amplifiers shall contain the capability of being remotely located through a four-wire SBUS communications circuit and a two-wire VBUS circuit. The system shall have the capability of adding up to four EVS-RCU remote command units.

3. The voice evacuation system shall have the capability of downloading 15 to 60 second messages and utilize DSP technology for higher audio intelligibility.

4. The voice evacuation system shall be capable of operating at 25vrms or 70.7vrms for the EVS-50 and only 25vrms for the EVS-125, shall be field selectable at the amplifier level. Systems that require additional modules for voltage conversion shall not be accepted.

5. The FACP shall contain one SLC circuit with the option of utilizing up to three 5815XL expander modules. Each SLC circuit shall support up to 99 detectors and 99 modules. The communication protocol on the SLC loop shall be digital.

6. The FACP shall support a minimum of six programmable Flexput circuits. The panel shall have a built in 80 character LCD annunciator with the capability of having an additional eight supervised remote annunciators connected in the field.

7. The FACP shall have a built-in UL approved digital communicator which shall allow local and remote up/downloading of system operating options, event history, and detector sensitivity data.

8. The FACP shall automatically test the smoke detectors in compliance with NFPA standards to ensure that they are within listed sensitivity parameters and be listed with Underwriters Laboratories for this purpose.

9. The FACP shall compensate for the accumulation of contaminants that affect detector sensitivity. The FACP shall have day/night sensitivity adjustments, maintenance alert feature (differentiated from trouble condition), detector sensitivity selection, auto-programming mode (Jumpstart) and the ability to upgrade the core operating software on site or over the telephone.

10. The FACP shall have maintenance alert feature (differentiated from trouble condition) and a calibration trouble condition.

11. The FACP shall have a jumpstart feature that can automatically enroll all properly connected accessories into a functional system within 60 seconds of powering up the panel. Panels that do not have these capabilities shall not be accepted.

12. The main communication bus (SBUS RS485) shall be capable of class A or class B configuration with a total bus length of 6,000 feet.

2.1.2 **System Wiring**

A. The Signaling Line Circuit (SLC) and data communication bus (SBUS) shall be wired with standard NEC 760 compliant wiring. No twisted, shielded or mid-capacitance wiring is permitted for standard installations. All FACP screw terminals shall be capable of accepting 14-18 AWG wire. All system wiring shall be in accordance with the requirements of NFPA 70, the National Electrical Code (NEC) and also comply with article 760 of the NEC.

2.1.3 **Signaling Line Circuits**

A. Each SLC shall be capable of a wiring distance of 10,000 feet from the SLC driver module (5815XL) and be capable of supporting 99 detectors and 99 addressable module devices. The communication protocol to SLC devices shall be digital. Any SLC loop device which goes into alarm shall interrupt the polling cycle for priority response from the FACP. The FACP shall respond consistently to a device that goes into alarm on an SLC within ten (10) seconds. The auxiliary 5815XL SLC loop module shall be capable of being located up to 6,000 feet from the FACP on the SBUS, which is

separate from the SLC circuit. The SLC shall be capable of functioning in a Class A or Class B configuration.

2.1.4 **SLC Loop Devices**

A. Devices supported shall include addressable photoelectric and ionization smoke detectors, addressable carbon monoxide detectors, addressable heat detectors, addressable input modules, relay output modules or addressable notification modules. There shall be no limit to the number of any particular device type up to the maximum of 99 detectors and 99 addressable modules that can be connected to the SLC.

2.1.5 **Addressable Detector Functions**

A. The products of combustion detectors shall communicate analog values using a digital protocol to the control panel for the following functions:

1. Automatic compliance with NFPA 72 standards for detector sensitivity testing.

2. Drift compensation to assure detector is operating correctly.

3. Maintenance alert when a detector nears the trouble condition.

4. Trouble alert when a detector is out of tolerance.

5. Alert control panel of analog values that indicate fire.

2.1.6 **Programmable Flexputs**

A. The FACP shall support six (6) programmable Flexput circuits that are capable of being programmed as supervised reverse polarity notification circuits or supervised auxiliary power circuits that can be programmed as continuous, resettable or door holder power. The circuits shall also be programmable as input circuits in Class A or Class B configurations to support dry contact or compatible two wire smoke detectors.

2.1.7 **Addressable Notification Module**

A. The contractor shall furnish and install where indicated on the plans, addressable notification modules, Silent Knight model SK-Control. The modules shall be UL listed compatible with Silent Knight's 5820XLEVS fire alarm control panel. The notification module shall provide one Class A or Class B notification output with one auxiliary power input. The notification module shall be suitable for mounting in a standard 4 inch square electrical box and shall include a plastic cover plate. The notification module shall provide an LED that is visible from the outside of the cover plate. The notification module shall be fully programmable for such applications as required by the installation. The SK-Control shall reside on

the SLC loop and can be placed up to 10,000 feet from the control or 5815XL SLC loop module.

2.1.8 **Annunciators**

A. The main control shall have a built in annunciator with an 80-character LCD display and feature LED's for General Alarm, Supervisory, System Trouble, System Silence and Power. When in the normal condition the LCD shall display time and date based on a 200 year clock which is capable of automatic daylight savings time adjustments. All controls and programming keys are silicone mechanical type with tactile and audible feedback. Keys shall have a travel of .040 inches. No membrane style buttons shall be permissible. The annunciator shall be able to silence and reset alarms through the use of a keypad entered code or by using a firefighter's key. The annunciators shall have twenty levels of user codes that shall allow the limitation of operating system programming to authorized individuals.

2.1.9 **Remote Annunciators**

A. The fire system shall be capable of supporting up to eight (8) remote LCD annunciators, Model 5860, and eight (8) LED remote annunciators, Model 5865. LCD remote annunciators shall have the same control and display layout so that they match identically the built-in annunciator. LED remote annunciators shall have individually mapped LED's and reset and silence inputs. The reset and silence inputs shall use the same firefighter's key as the LCD annunciators. Remote annunciators shall be capable of operating at a distance of 6,000 feet from the main control panel on unshielded, non-twisted cable.

2.1.10 **I/O Module**

A. The fire system shall be able to support up to eight (8) I/O modules, Model 5880, which shall be used to drive remote LED graphic style displays and accommodate up to eight dry contact type switch inputs. The I/O modules shall each drive up to 40 LEDs without requiring external power connections. The I/O module inputs shall be supervised and be suitable for alarm and trouble circuits as well as reset and silence switches.

2.1.11 **Serial/Parallel Interface**

A. The fire system shall be capable of supporting up to two (2) serial / parallel interface modules, Model 5824, that are capable of driving standard computer style printers. The interface shall be programmable as to what information is sent to it and shall include the ability to print out detector status by point, event history by point, and system programming.

2.1.12 **Distributed Power Modules**

A. The contractor shall supply (where required) a power module, Model 5895XL, compatible with the 5820XLRVS fire alarm control panel. The power module shall have 6 amps of output power, six (6) Flexput circuits rated at 3 amps each, and two form C relay circuits rated at 2.5 amps at 24 volts DC. The six Flexput circuits shall have the same functionality as the Flexput circuits on the main panel. The 5895XL shall be capable of being connected via the SBUS at a maximum distance of 6000 feet from the main control panel. The power module shall contain an additional SBUS that is completely compatible with all 5820XLEVS add-on modules including 5860 remote annunciators, 5824 serial/parallel modules and addressable devices. The power module shall also act as a bus repeater so that additional SBUS devices can be connected at a maximum distance of 6,000 feet from the power module.

B. The contractor shall supply (where required) a power module model 5496 compatible with the 5820XLEVS fire alarm control panel. The power module shall have 6 amps of output power with four (4) notification circuits rated at 3 amps each. The four notification circuits shall operate as reverse polarity notification outputs or auxiliary power outputs for constant, resettable, or door holder applications. The 5496 shall be capable of being connected via the SBUS at a maximum distance of 6000 feet from the main control panel.

C. The 5820XL shall be capable of supporting up to eight (8) of the distributed power modules in any combination.

D. The power module's SBUS bus shall be electrically isolated providing ground loop isolation and transient protection.

2.1.13 **Digital Communicator**

A. The digital communicator shall be an integral part of the control panel and be capable of reporting all zones or points of alarm, supervisory, and trouble as well as all system status information such as loss of AC, low battery, ground fault, loss of supervision to any remote devices with individual and distinct messages to a central station or remote station. The communicator shall also be capable of up/downloading of all system programming options, event history and sensitivity compliance information to a PC on site or at a remote location.

B. The communicator shall have an answering machine bypass feature that shall allow the panel to respond to communication even on phone lines that have other communication equipment present. The communicator shall be capable of reporting via SIA and Contact ID formats. The communicator shall have a delayed AC loss report function which shall provide a programmable report delay plus a 10-25 min random component to help ease traffic to the central station during a power outage. No controls that use

external modems for remote programming and diagnostics shall be accepted.

C. Provide a dual line digital communicator with battery back-up. Unit shall be activated by fire alarm panel and shall signal an UL listed central station. Wire the digital communicator line seizure to two (2) existing outside (trunk) telephone lines. Coordinate system communication with local 911 Center providing point-to-point information of alarm.

2.1.14 **Dry Contacts**

A. The FACP shall have three (3) form "C" dry contacts, one (1) shall be dedicated to trouble conditions, the other two (2) shall be programmable for alarm, trouble, sprinkler supervisory, notification, pre-alarm, waterflow, manual pull, zone aux. 1 or zone aux. 2. The trouble contact shall be normal in an electrically energized state so that any total power loss (AC and backup) shall cause a trouble condition. In the event that the microprocessor on the FACP fails, the trouble contacts shall also indicate a trouble condition.

2.1.15 **Ground Fault Detection**

A. There shall be a ground fault detection circuit to detect positive and negative grounds on all field wiring. The ground fault detection shall operate the general trouble devices as specified but shall not cause an alarm to be sounded. Ground fault shall not interfere with the normal operation, such as alarm, or other trouble conditions.

2.1.16 **Overcurrent Protection**

A. All low voltage circuits shall be protected by microprocessor controlled power limiting or self restoring poly switches for the following: smoke detector power, main power supply, indicating appliance circuits, battery standby power and auxiliary output.

2.1.17 **Test Functions**

A. A Lamp Test mode shall be a standard feature of the fire alarm control panel and shall test all LED's and the LCD display on the main panel and remote annunciators.

B. A Walk Test mode shall be a standard feature of the fire alarm control panel. The walk test feature shall function so that each alarm input tested shall operate the associated notification appliances for six seconds. The FACP shall then automatically perform a reset operation and confirm normal device operation. The event memory shall contain the information on the point tested.

C. A Fire Drill mode shall allow the manual testing of the fire alarm system notification circuits. The Fire Drill shall be capable of being controlled at the main annunciator, remote annunciators and a remote contact input.

D. A bypass mode shall allow for any point or NAC circuit to be bypassed without affecting the operation of the total fire alarm system.

2.1.18 **Remote Input Capabilities**

A. The control panel shall have provisions for supervised switch inputs for the purpose of alarm reset, and alarm and trouble restore.

2.1.19 **Notification Appliance Mapping Structure**

A. All notification circuits and modules shall be programmable via a mapping structure that allows for a maximum of 250 output groups. Each of these groups shall have the ability to be triggered by any of the panel's 125 zones. A zone may trigger groups individually or may contain a global trigger for manual pull stations, fire drills and two different system alarms. Additionally, each zone shall individually control the cadence pattern of each of the groups that it is "mapped" to so that sounders can indicate a variety of conditions. The zone shall be capable of issuing a different cadence pattern for each of the groups under its control. The mapping structure shall also allow a group to be designated to "ignore cadence" for use with strobes and other continuous input devices. Zones shall have eight different output categories; Detector Alarm, Trouble, Supervisory, Pre-Alarm, Waterflow, Manual pull, Zone Auxiliary 1 and Zone Auxiliary 2. Each of the categories shall have the ability to control from 1 to 8 output groups with a cadence pattern. The patterns are; March Code, ANSI S-3.41, Single Stroke Bell Temporal, California Code, Zone 1 Coded, Zone 2 Coded, Zone 3 Coded, Zone 4 Coded, Zone 5 Coded, Zone 6 Coded, Zone 7 Coded, Zone 8 Coded, Custom Output Pattern 1, Custom Output Pattern 2, Custom Output Pattern 3, Custom Output Pattern 4, Constant, ANSI 4 Temporal, Amseco Synchronization, Faraday Synchronization, Gentex Synchronization, System Sensor Synchronization and Wheelock Synchronization. This mapping/cadence pattern shall be supported by all system power supplies and notification expander modules.

2.1.20 **On-Board Programmer**

A. The FACP shall have an on board programmer which shall allow for all system functions and options to be programmed via the on board annunciator keypad. Any panel that does not have this capability shall not be accepted.

2.1.21 **Downloading Software**

A. The fire alarm control panel shall support up/downloading of system programming from a PC under Windows XP, Windows Vista, or Windows 7. The FACP shall also be able to download the detector sensitivity test results and a 1000 event system event buffer to the PC. Communication shall take place over a direct connection to the PC and/or via the same telephone lines as the built in digital communicator and shall not require an external modem to be connected to the panel. The downloading software

shall contain a code that shall block unauthorized persons from accessing the panel via direct connection or over the phone lines.

2.1.22 **Facility Management Software**

A. The FACP shall support facility management software capable of providing off site access to FACP data that is necessary to manage fire system operation. A software package capable of uploading the detector sensitivity test results and the 1000 event system event buffer to the PC shall be required as part of the bid package. Communication shall take place over a direct connection to the PC and/or via the same telephone lines as the built in digital communicator. The facility management package shall be separate from the downloading package and shall not be capable of affecting programmed system options.

2.1.23 **English Language Descriptions**

A. The FACP shall provide the ability to have a text description of each system device, input zone and output group on the system. The use of individual lights to provide descriptions shall not be acceptable.

2.2 **System Operation**

2.2.1 **Alarms**

A. When a device indicates any alarm condition, the control panel shall respond within ten (10) seconds. The general Alarm or Supervisory alarm LED on the annunciator(s) shall light and the LCD shall prompt the user as to the number of current events. The alarm information shall be stored in event memory for later review. Event memory shall be available at the main and all remote annunciators.

B. When the alarmed device is restored to normal, the control panel shall be required to be manually reset to clear the alarm condition, except that the alarms may be silenced as programmed.

C. An alarm shall be silenced by a code or firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event shall occur (subsequent alarm feature). When alarms are silenced the Silenced LED on the control panel, and on any remote annunciators, shall remain lit until the alarmed device is returned to normal.

2.2.2 **Troubles**

A. When a device indicates a trouble condition, the control panel Trouble LED on the annunciator(s) shall light and the LCD shall prompt the user as to the number of current events. The trouble information shall be stored in event memory for later review. Event memory shall be available at the main and all remote annunciators. A trouble shall be silenced by a code or firefighter

key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event shall occur.

2.2.3 **Supervision Methods**

A. Each SLC loop shall be electrically supervised for opens and ground faults in the circuit wiring, and shall be so arranged that a fault condition on any loop shall not cause an alarm to sound.

B. Additionally, every addressable device connected to the SLC shall be supervised and individually identified if in a fault condition. The occurrence of any fault shall light a Trouble LED and sound the system trouble sounder, but shall not interfere with the proper operation of any circuit which does not have a fault condition.

C. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits shall not cause an alarm to sound. The occurrence of any fault shall light the trouble LED and sound the system trouble sounder, but shall not interfere with the proper operation of any circuit which does not have a fault condition.

END OF SECTION TWO

SECTION THREE: SYSTEM COMPONENTS

3.0 Control Unit

3.1 System Cabinet Mounting

A. The system cabinet shall be red and may be either surface or flush mounted. The cabinet door shall be easily removable to facilitate installation and service.

3.2 Audible System Trouble Sounder

A. An audible system trouble sounder shall be an integral part of the control unit. Provisions shall also be provided for an optional supervised remote trouble signal.

3.3 Power Supply and Charger:

A. The entire system shall operate on 24 VDC, filtered switch mode power supply with the rated current available of 6 Amps. The FACP shall have a battery charging circuit capable of complying with the following requirements:

1. Sixty (60) hours of battery standby with five (5) minutes of alarm signaling at the end of this sixty (60) hour period (as required per NFPA 72 remote station signaling requirements) using rechargeable batteries with automatic charger to maintain standby gel-cell batteries in a fully charged condition.

OR

Twenty-four (24) hours of battery standby with five (5) minutes of alarm signaling at the end of this twenty-four (24) hour period (as required per NFPA 72 central station signaling requirements) using rechargeable batteries with automatic charger to maintain gel-cell batteries in a fully charged condition.

B. The power supply shall comply with UL Standard 864 for power limiting.

C. The FACP shall indicate a trouble condition if there is a loss of AC power or if the batteries are missing or of insufficient capacity to support proper system operation in the event of AC failure. A battery test shall be performed automatically every minute to check the integrity of the batteries. The test shall disconnect the batteries from the charging circuit and place a load on the battery to verify the battery condition.

D. In the event that it is necessary to provide additional power one or more of the model 5895XL or 5496 distributed power modules shall be used to accomplish this purpose.

3.4 Connections and Circuits

A. Connections to the light and power service shall be on a dedicated branch circuit in accordance with the National Fire Alarm Code NFPA 72, National Electrical Code (NEC) NFPA 70, and the local authority having jurisdiction (AHJ). The circuit and connections shall be mechanically protected. A circuit disconnecting means shall be accessible only to authorized personnel and shall be clearly marked “FIRE ALARM CIRCUIT CONTROL”.

END OF SECTION THREE

SECTION FOUR: ACCESSORY COMPONENTS

4.1 The FACP shall support the following devices on the SBUS:

5815XL	Signaling Line Circuit Expander (SLC) Module
5824	Printer Interface Module
EVS-VCM	Voice Control Module
EVS-SW24	Additional 24 Zone Switch Module
EVS-50 W	50 Watt Amplifier (4 max.)
EVS-125W	125 Watt Amplifier (4 max)
EVS-CE4 4	Zone Splitter
EVS-RVM	Remote Microphone (4 max.)
5860	LCD Remote Annunciator
5865-3	LED Remote Annunciator
5865-4	LED Remote Annunciator with reset and silence switches
5880	LED I/O module
5895XL	Intelligent Distributed Power Module
5496	Intelligent Remote Power Supply 6.0 Amp

4.2 The FACP shall support the operation of 99 detectors and 99 addressable module total devices per SLC loop without regard to device type. The following devices shall be supported:

SK-Photo	Addressable Photoelectric Smoke detector
SK-Photo-T	Addressable Photoelectric Smoke detector with Thermal
SK-Ion	Addressable Ionization Sensor
SK-Heat	Addressable Heat Sensor
SK-Heat-ROR	Addressable Heat with Rate of Rise
SK-Heat-HT	Addressable Heat High temp 190°
SK-Acclimate	Addressable Multi Criteria Smoke detector with thermal
SK-Duct	Duct Detector
SK-Relay	Addressable Relay Module
SK-Relay-6	Addressable Multi Relay Module
SK-Monitor	Addressable Input Module (Class A or B)
SK-Minimon	Mini Input Module
SK-Monitor-2	Addressable Dual Input Module
SK-Mon-10	Addressable Multi Input Module (10)
SK-Control	Addressable Notification Module
SK-Control-6	Addressable Notification Multi Module (6)
SK-Zone	Two Wire Smoke Detector Module
SK-Zone-6	6 Multi Smoke Detector Module
SK-Iso	Isolation Module
SK-Beam	Addressable Beam Detector
SK-Beam-T	Addressable Beam Detector with Test feature
B224RB	Detector Relay Base
B200S	Detector Sounder Base
B224BI	Detector Isolator Base
RTS151KEY	Key Activated Remote Test Switch for Photoelectric Duct Detector

M02-04-01	Detector Test Magnet
M02-09-01	Telescoping Test Magnet
SK-Pull-SA	Addressable Single Action Pull Station
SK-Pull-DA	Addressable Dual Action Pull Station

The FACP shall support these other Silent Knight devices via addressable input, addressable notification, or addressable output modules.

PS-DALOB	Dual Action Manual Pull Outdoor Listed
PS-DAH	Dual Action Manual Pull Hex Key reset
PS-SATK	Single Action Manual Pull Station – Key Reset
PS-DATK	Dual action Manual Pull Station – Key Reset
PS-DASP	Dual action Manual Pull Station "Spanish"- Key reset
PS-SATK	Pull station, single action, key reset
PS-SATK-WP	Weather proof Pull station, single action, key reset
SB-I/O	Surface mount back box for outdoor use.
SB-10	Surface back box

4.3 Furnish and install, where shown on the drawings, the following devices:

4.3.1 **Manual Fire Alarm Stations**

A. Manual fire alarm stations shall be non-coded, break glass, single or double action type, with a key operated test-reset lock in order that they may be tested, and so designed that after actual emergency operation, they cannot be restored to normal except by use of a key. The reset key shall be so designed that it shall reset manual station and open FACP without use of another key. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of fifty feet, front or side. Manual stations shall be constructed of LEXAN® with clearly visible operating instructions on the front of the stations in raised letters. Stations shall be suitable for surface mounting on matching back box or semi-flush mounting on a standard single-gang box and shall be installed within the limits defined by the Americans with Disabilities Act (ADA) dependent on manual station accessibility or per local requirements. Manual stations shall be Model SK-Pull-SA or SK-Pull-SA. If using conventional pull stations they shall be installed in conjunction with an addressable input module (SK-Monitor) or mini input module (SK-Minimon). Manual stations shall be Silent Knight Model PS-DATK, PS-SATK, PS-DA or PS-SA and Underwriters Laboratories listed when used with addressable modules.

4.3.2 **Remote Power Supplies**

A. The remote power supplies for notification appliances shall be the Silent Knight Models 5496 and/or 5895XL. The 5496 and 5895XL intelligent power supplies shall hang on the main SBUS and be programmed through the 5820XLEVS control. The 5496 shall support 6 amps of 24 volt DC power with 4 notification circuits rated at 3 amps each.

B. The 5895XL shall support 6 amps of 24 volt DC power, with 6 Flexput circuits, rated at 3amps each. Two additional 5815XL SLC loop expanders shall be capable of being installed in the cabinet, to allow an additional 396 points. The power supply shall also regenerate the SBUS for an additional 6,000 feet.

C. The remote power supply model 5495 or 5499 may also be used on the system. These power supplies support 6 amps or 9 amps of 24 VDC power with 4 notification circuits rated at 3amps each. These power boosters may also be activated from another notification circuit from either the fire alarm control or the distributed power modules.

4.3.3 **Notification Devices**

A. The visual and audio/visual signaling devices shall be compatible with the 5820XLEVS, 5495, 5496, 5499, or 5895XL as stated in the installation manuals and be listed with Underwriters Laboratories Inc. per UL 1971 and/or 1638. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults on the circuit wiring and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits shall not cause an alarm to sound. The occurrence of any fault shall light the trouble LED and sound the system trouble sounder, but shall not interfere with the proper operation of any circuit which does not have a fault condition. The notification appliance (combination audio/visual units only) shall produce a peak sound output of 90 dba or greater as measured in an anechoic chamber. The appliance shall be capable of meeting the candela requirements of the plans presented by the Engineer and ADA. The appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount a single gang or double gang box or double workbox with the use of an adapter plate. The unit shall have an input voltage range of 16-33 volts.

4.3.4 **Smoke Detectors**

A. Smoke detectors shall be Silent Knight Model SK-Photo ceiling mounted, addressable photoelectric smoke detectors or SK-Acclimate multi-criteria photoelectric smoke detector. The combination detector head and twist lock base shall be UL listed compatible with the Silent Knight 5820XLEVS fire alarm control panel. The base shall permit direct interchange with Silent Knight's SK-Ion ionization smoke detector, SK-Acclimate multi-criteria smoke detector or the SK-Heat detector. The base shall be the appropriate twist lock base B210LP. The smoke detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED shall latch on steady at full brilliance. The detector may be reset by actuating the control panel's reset switch. The sensitivity of the detector shall be capable of being selected and measured by the control panel without the need for external test equipment. The vandal security-locking feature shall be used in those areas as indicated on the drawing. The locking feature shall be field selectable when required. It shall be possible to

perform a sensitivity test of the detector without the need of generating smoke. The test method shall simulate the effects of products of combustion in the chamber to ensure testing of the detector circuits. Detectors shall have completely closed back to restrict entry of dust and air turbulence and have a 30 mesh insect screen. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

4.3.5 **Heat Detectors**

A. Furnish and install analog/addressable heat detectors, Silent Knight model SK-Heat. The combination heat detector and twist lock base shall be U.L. listed compatible with the Silent Knight 5820XLEVS fire alarm control panel. The base shall permit direct interchange with the Silent Knight SK-Ion smoke detector, SK-Acclimate smoke detector and the SK-Photo photoelectric smoke detector. The base shall be appropriate twist lock base B210LP. The heat detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED shall latch on steady at full brilliance. The detector may be reset by actuating the control panel's reset switch. The vandal security-locking feature shall be used in those areas as indicated on the drawings. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

4.3.6 **Duct Detectors**

A. Duct Detector shall be Silent Knight Model SK-Duct Housing that includes the Model SK-Photo smoke detector head.

END OF SECTION FOUR

SECTION FIVE: WIRING

5.1 Installer's Responsibilities

A. The installer shall coordinate the installation of the fire alarm equipment.

B. All conductors and wiring shall be installed according to the manufacturer's recommendations.

C. It shall be the installer's responsibility to coordinate with the supplier regarding the correct wiring procedures before installing any conduits or conductors.

5.2 Installation of System Components

A. System components shall be installed in accordance with the latest revisions of the appropriate NFPA pamphlets, the requirements contained herein, National Electrical Code, local and state regulations, the requirements of the fire department and other applicable Authorities Having Jurisdiction (AHJ).

B. All wire used on the fire alarm system shall be UL listed as fire alarm protection signaling circuit cable per National Electrical Code, Articles 760.

END OF SECTION FIVE

SECTION SIX: WARRANTY AND FINAL TEST

6.1 General

A. The contractor shall warranty all materials, installation and workmanship for Two (2) years from date of acceptance, unless otherwise specified. A copy of the manufacturers' warranty shall be provided with closeout documentation and included with the operation and installation manuals.

B. The System Supplier shall maintain a service organization with adequate spare parts stocked within 75 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the Owner notifying the contractor.

C. Technical Support: Beginning with Substantial Completion, providing software support for Two (2) years, shall be included in this project.

D. Detector Sensitivity Testing: During the warranty period, each year the contractor is to perform detector sensitivity testing and provide report to the Owner. Unless, the system is UL Listed to perform automatic sensitivity testing without any manual intervention and shall detector fall outside of sensitivity window, the system shall automatically indicate a devices trouble. A copy of UL letter is to be provided as proof of system operation.

E. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within Two (2) years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.

1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

F. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Provide quantity equal to 2% percent of amount of each type installed, but no fewer than 2 unit of each type.

    a. Smoke Detectors, heat detectors, manual pull stations, duct smoke detector, monitor modules and control modules.

    b. Notification appliances; speakers, speaker-strobes and strobes.

    c. Furnish ten extra set(s) of keys for access to locked and tamperproof components.

A. Before the installation shall be considered completed and acceptable by the owner, a test of the system shall be performed as follows:

1. The contractor's job foreman, a representative of the owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.

2. At least one half of all tests shall be performed on battery standby power.

3. Where application of heat would destroy any detector, it may be manually activated.

4. The communication loops and the indicating appliance circuits shall be opened in at least two (2) locations per circuit to check for the presence of correct supervision circuitry.

B. When the testing has been completed to the satisfaction of both the contractor's job foreman and owner, a notarized letter cosigned by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.

C. The contractor shall leave the fire alarm system in proper working order and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority.

D. Prior to final test the fire department shall be notified in accordance with local requirements.

6.3 As-Built Drawings, Testing, and Maintenance Instructions

6.3.1 As-Built Drawings

A. A complete set of reproducible "as-built" drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system.

6.3.2 Operating and Instruction Manuals

A. Operating and instruction manuals shall be submitted prior to testing of the system. Three (3) complete sets of operating and instruction manuals shall be delivered to the owner upon completion. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864.

END OF SECTION SIX